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Atomic force microscopy analysis of DNA extracted from the vegetative cells and the viable, but nonculturable, cells of two mycoplasmas (Acholeplasma laidlawii PG8 and Mycoplasma hominis PG37)

Trushin M., Chernov V., Gorshkov O., Baranova N., Chernova O.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

This article reports on a study of some characteristics of DNA extracted from the vegetative and viable, but nonculturable (VBNC), cells of two mycoplasma species (Acholeplasma laidlawii PG8 and Mycoplasma hominis PG37) using atomic force microscopy (AFM). DNA images were obtained by operating the AFM microscope in the tapping mode. It was found that DNA from the VBNC forms of M. hominis PG37 has decreased sizes (height: 0.177 ± 0.026 nm vs. 0.391 ± 0.041 nm for the vegetative forms, and width: 1.92 ± 0.099 vs. 2.17 ± 0.156 nm for the vegetative forms) in comparison to DNA from the vegetative forms of the mycoplasma. In the case of DNA from the A. laidlawii PG8 VBNC forms, we detected a decrease in width (1.506 ± 0.076 nm vs. 1.898 ± 0.117 nm for the vegetative forms), but an increase in height (0.641 ± 0.068 nm vs. 0.255 ± 0.010 nm for the vegetative forms) of the molecule. Analyzing the obtained results, one can speculate on some similarities in the physical-chemical properties of DNA from M. hominis PG37 and M. gallisepticum S6. In turn, this implies some general mechanisms of adaptation to a severe environment.

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Keywords

Acholeplasma laidlawii PG8, Atomic force microscopy, DNA, Mycoplasma, Mycoplasma hominis PG37